1901 **RADIO: HEAVISIDE/KENNELLY LAYER** **O Heaviside (UK) and A Kennedy (USA)**

When Marconi first succeeded in establishing radio communication around the curvature of the earth in 1901, Oliver Heaviside in England and Arthur Kennelly in the USA proposed that the phenomena might be due to the existence of an ionized layer in the upper atmostphere surrounding the earth which could reflect radio waves. However, another explanation was that the waves were detectable because of diffraction around the earth's curvature, a phenomenon which would be more observable, the longer the wavelength used. Another explanation could be that of the bending of the wavefront which would occur if the dielectric constant of the atmosphere should progressively change with altitude due to the effects of temperature, density and moisture.

The observation of the waves of high frequency drew renewed attention to the proposals of Heaviside and Kennelly. Their hypothetical layer was dubbed the Heaviside–Kennelly layer. Breit and Tuve in 1926, definitely confirmed the existence of several such layers by sounding the atmosphere with short pulses sent from a transmitter on earth which were reflected from the layers back to a receiver adjacent to the transmitter. The time delay identificd the height of each reflection and determined physical characteristics of the nature of the reflection and the degree of penetration as a function of frequency. Thc Breit–Tuve experiments were a predecessor of later radar techniques. The vagaries observed by the earlier experimenters began to be explainable and even predictable. The region of the several layers was renamed the 'Ionosphere' and the individual layers designated the D, E, F_1 and F_2 layers, the D layer being the lowest.

SOURCE: 'Telecommunications—the resource not depleted by use. A historical and philosophical resume' by W L Levitt *Proc. IEEE* vol 64, No 9, p 1297 (September 1976)